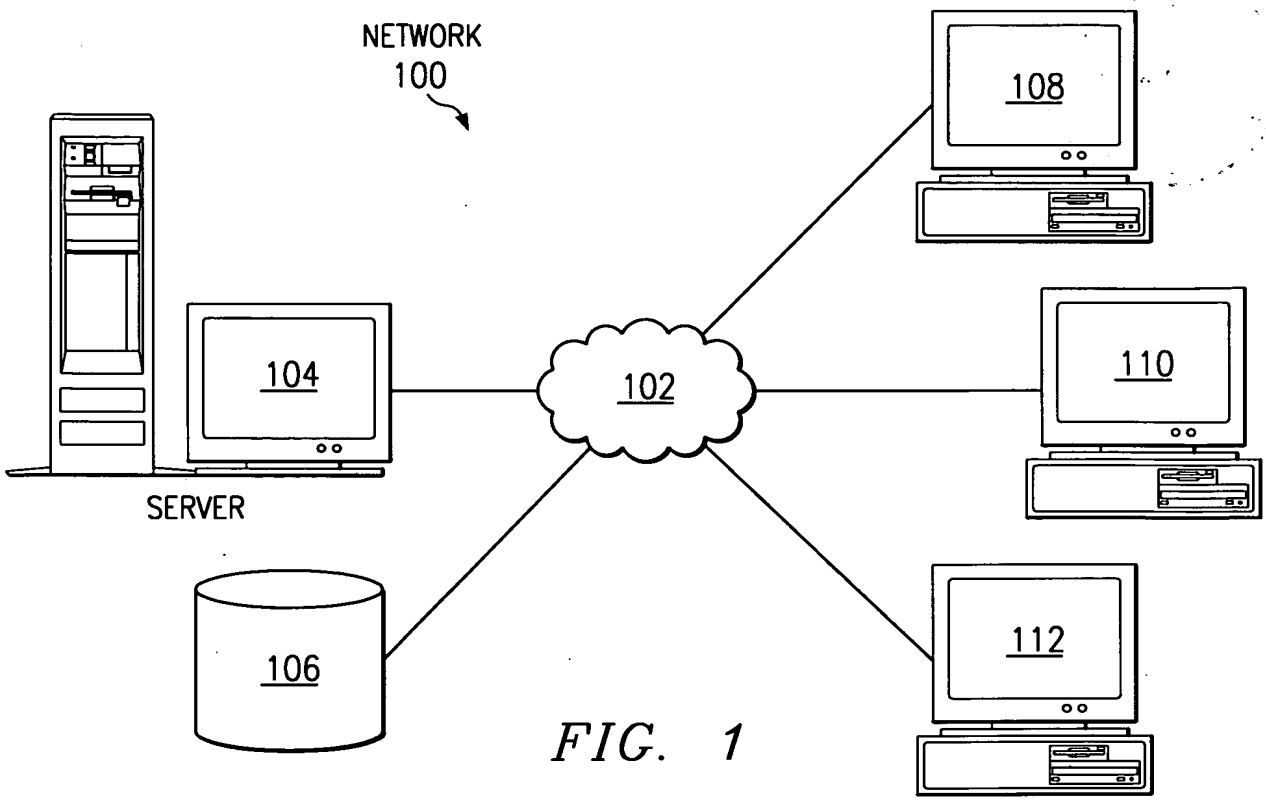

NETWORK
100
108
104
102
110
SERVER
106
112

FIG. 1

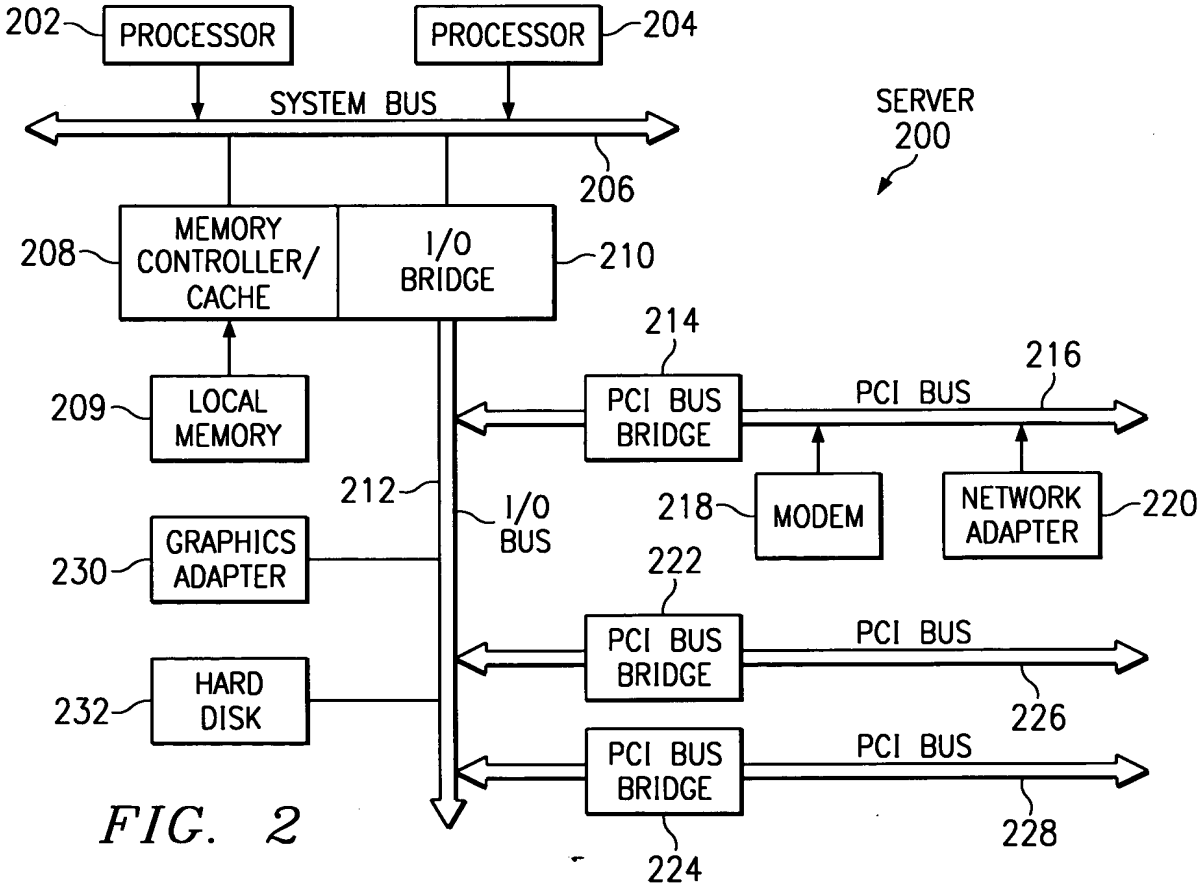

202
PROCESSOR
PROCESSOR
204
SYSTEM BUS
206
SERVER
200
208
MEMORY CONTROLLER/ CACHE
I/O BRIDGE
210
214
216
209
LOCAL MEMORY
PCI BUS BRIDGE
PCI BUS
212
I/O BUS
218
MODEM
NETWORK ADAPTER
220
230
GRAPHICS ADAPTER
222
PCI BUS BRIDGE
PCI BUS
232
HARD DISK
226
PCI BUS BRIDGE
PCI BUS
228
224

FIG. 2

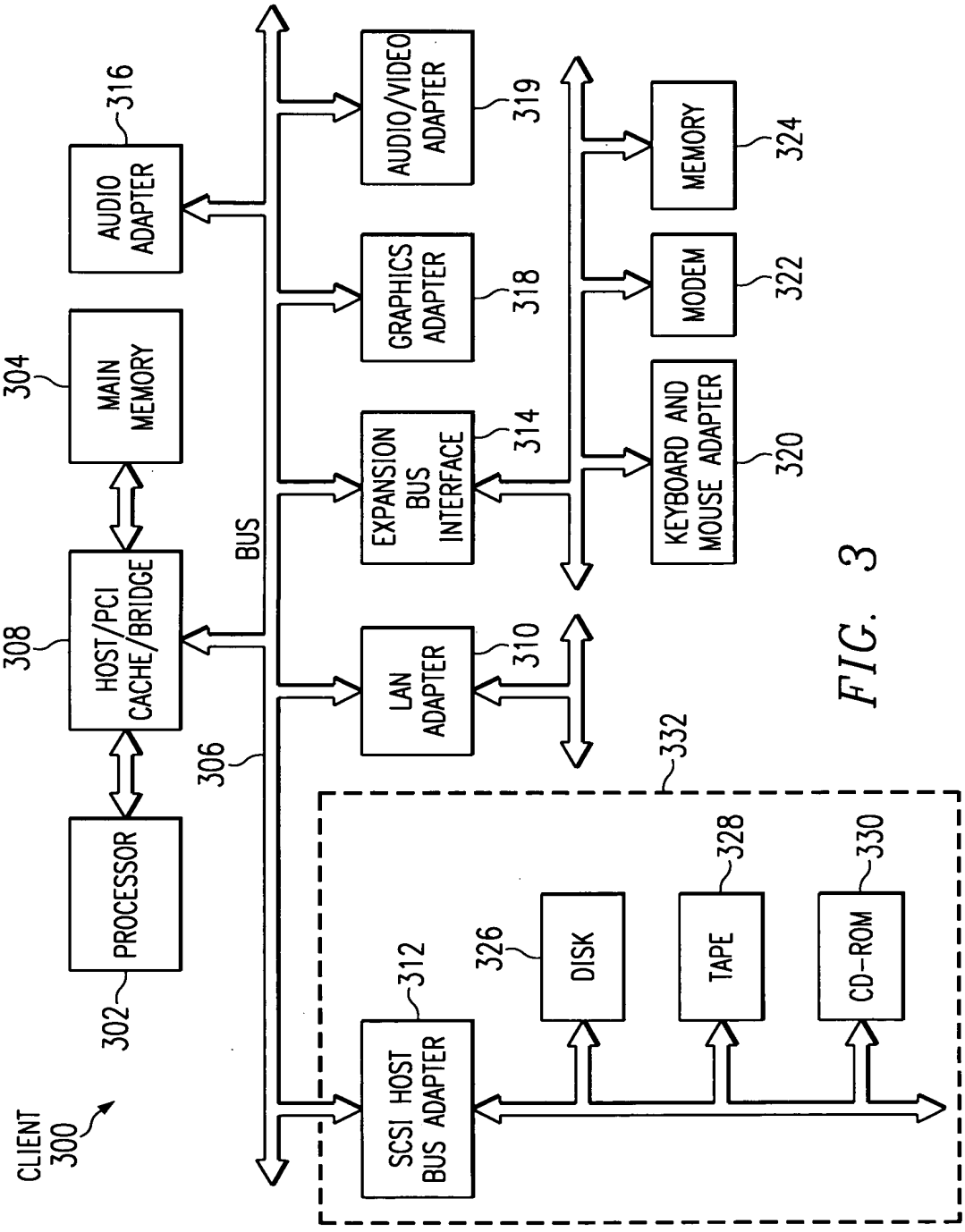

CLIENT
300
PROCESSOR
302
HOST/PCI
CACHE/BRIDGE
308
MAIN
MEMORY
304
AUDIO
ADAPTER
316
BUS
306
LAN
ADAPTER
310
EXPANSION
BUS
INTERFACE
314
GRAPHICS
ADAPTER
318
AUDIO/VIDEO
ADAPTER
319
KEYBOARD AND
MOUSE ADAPTER
320
MODEM
322
MEMORY
324
332
SCSI HOST
BUS ADAPTER
312
DISK
326
TAPE
328
CD-ROM
330

FIG. 3

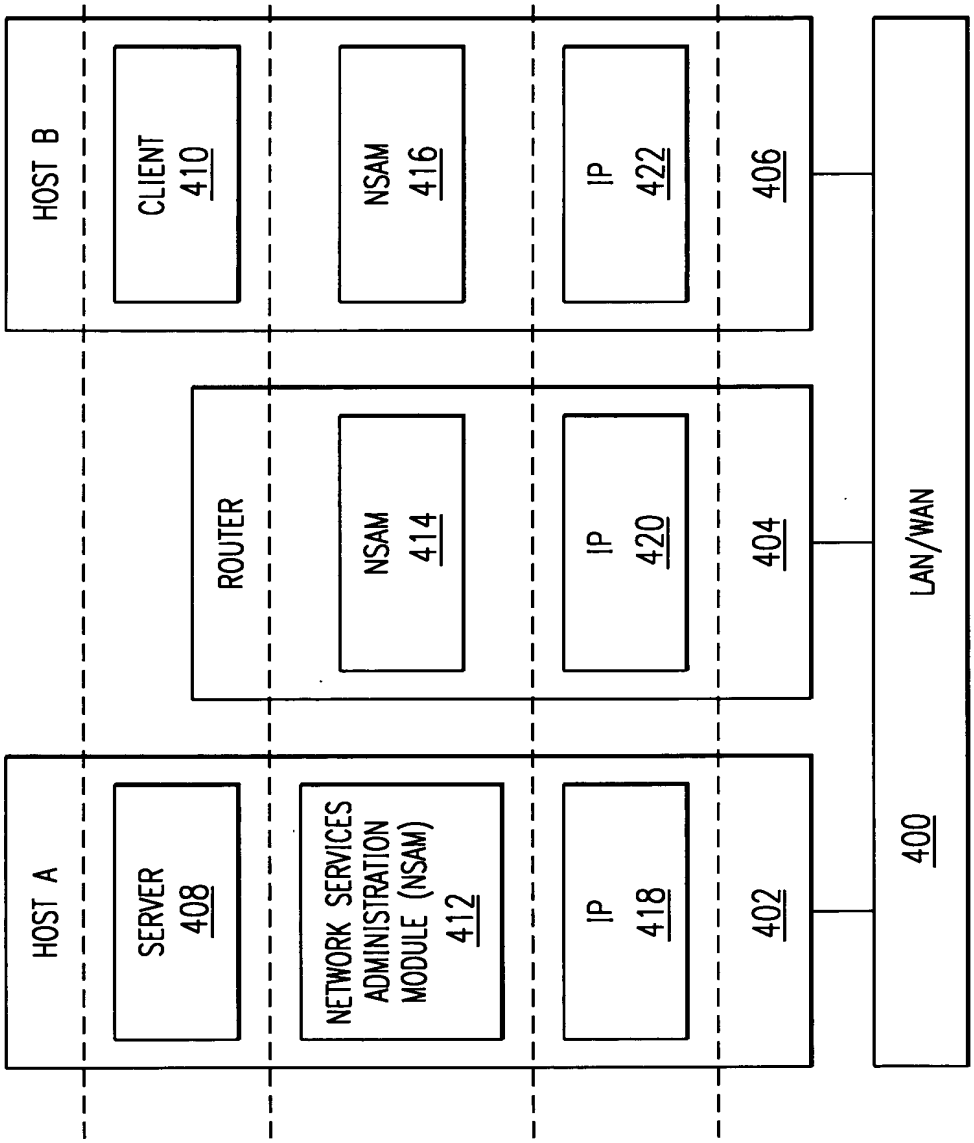

APPLICATION LAYER 424
SESSION LAYER 426
NETWORK LAYER 428
HOST B
CLIENT 410
NSAM 416
IP 422
406
ROUTER
NSAM 414
IP 420
404
HOST A
SERVER 408
NETWORK SERVICES ADMINISTRATION MODULE (NSAM) 412
IP 418
402
400
LAN/WAN

FIG. 4

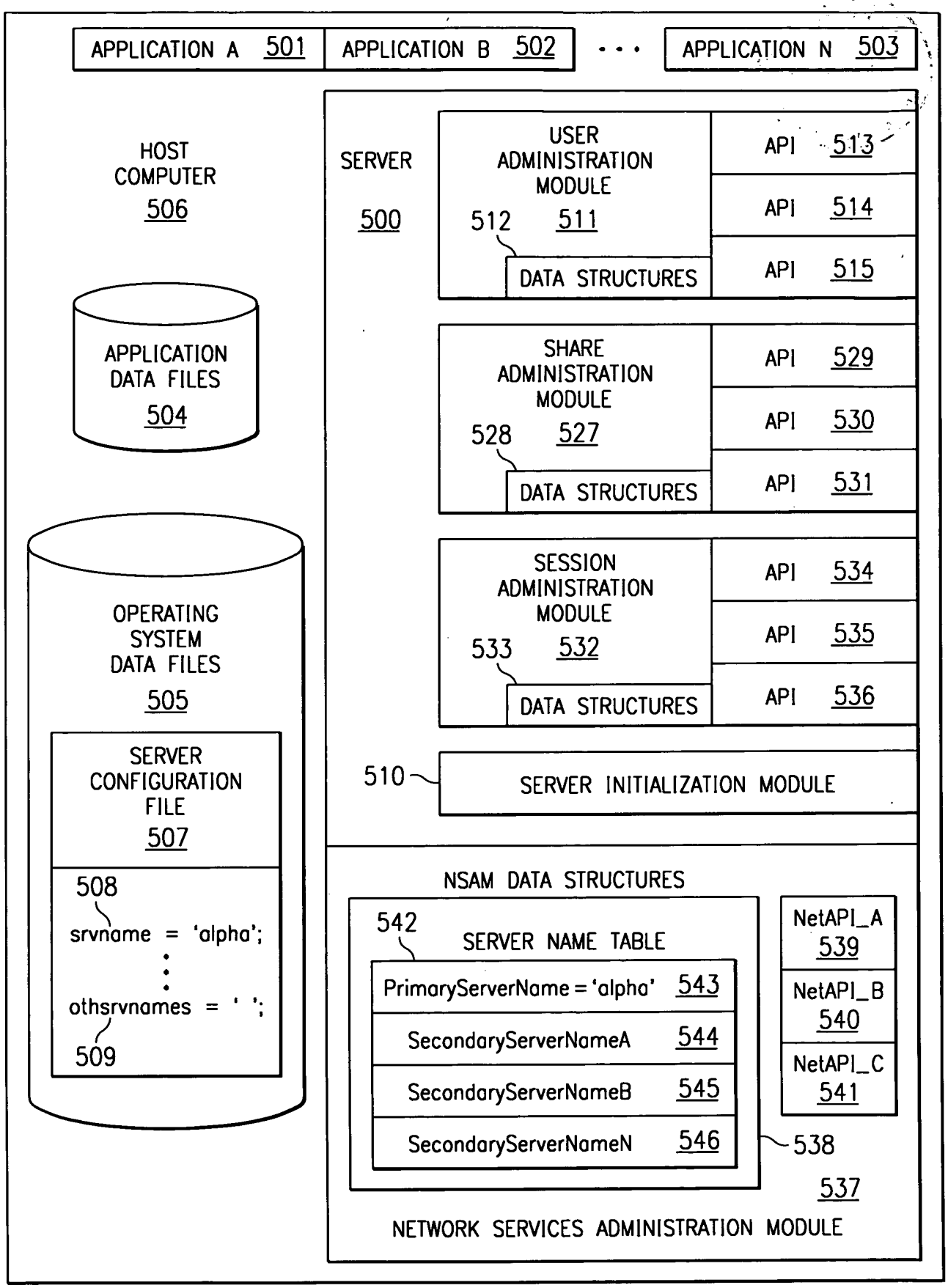

APPLICATION A 501
APPLICATION B 502
APPLICATION N 503
HOST COMPUTER 506
APPLICATION DATA FILES 504
OPERATING SYSTEM DATA FILES 505
SERVER CONFIGURATION FILE 507
508
srvname = 'alpha';
othsrvnames = ' ';
509
SERVER 500
USER ADMINISTRATION MODULE 511
512
DATA STRUCTURES
API 513
API 514
API 515
SHARE ADMINISTRATION MODULE 527
528
DATA STRUCTURES
API 529
API 530
API 531
SESSION ADMINISTRATION MODULE 532
533
DATA STRUCTURES
API 534
API 535
API 536
510
SERVER INITIALIZATION MODULE
NSAM DATA STRUCTURES
542
SERVER NAME TABLE
PrimaryServerName = 'alpha' 543
SecondaryServerNameA 544
SecondaryServerNameB 545
SecondaryServerNameN 546
538
NetAPI_A 539
NetAPI_B 540
NetAPI_C 541
537
NETWORK SERVICES ADMINISTRATION MODULE

FIG. 5

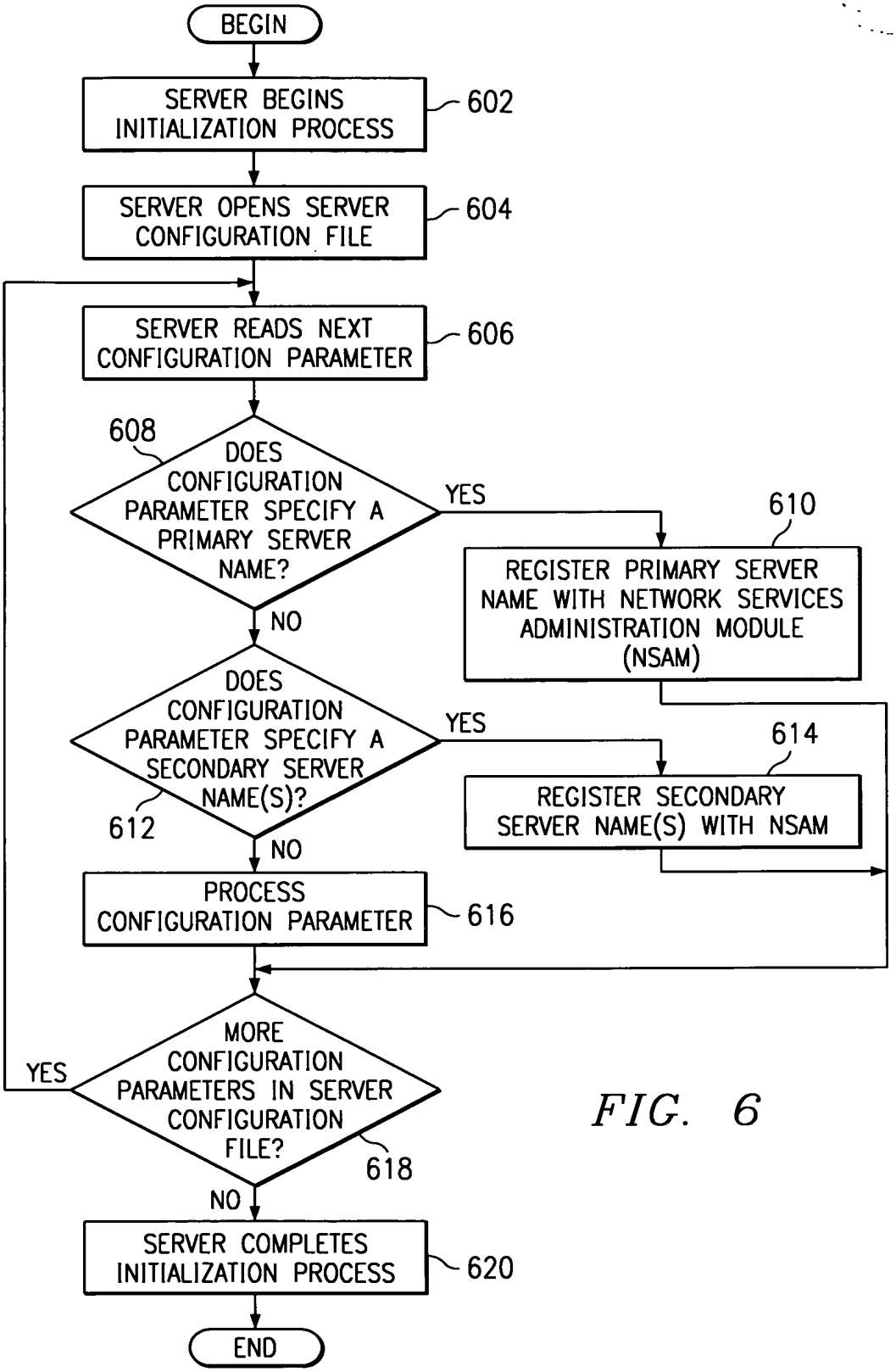

BEGIN
SERVER BEGINS INITIALIZATION PROCESS
602
SERVER OPENS SERVER CONFIGURATION FILE
604
SERVER READS NEXT CONFIGURATION PARAMETER
606
608
DOES CONFIGURATION PARAMETER SPECIFY A PRIMARY SERVER NAME?
YES
610
REGISTER PRIMARY SERVER NAME WITH NETWORK SERVICES ADMINISTRATION MODULE (NSAM)
NO
DOES CONFIGURATION PARAMETER SPECIFY A SECONDARY SERVER NAME(S)?
YES
614
REGISTER SECONDARY SERVER NAME(S) WITH NSAM
612
NO
PROCESS CONFIGURATION PARAMETER
616
MORE CONFIGURATION PARAMETERS IN SERVER CONFIGURATION FILE?
YES
618
NO
SERVER COMPLETES INITIALIZATION PROCESS
620
END

FIG. 6

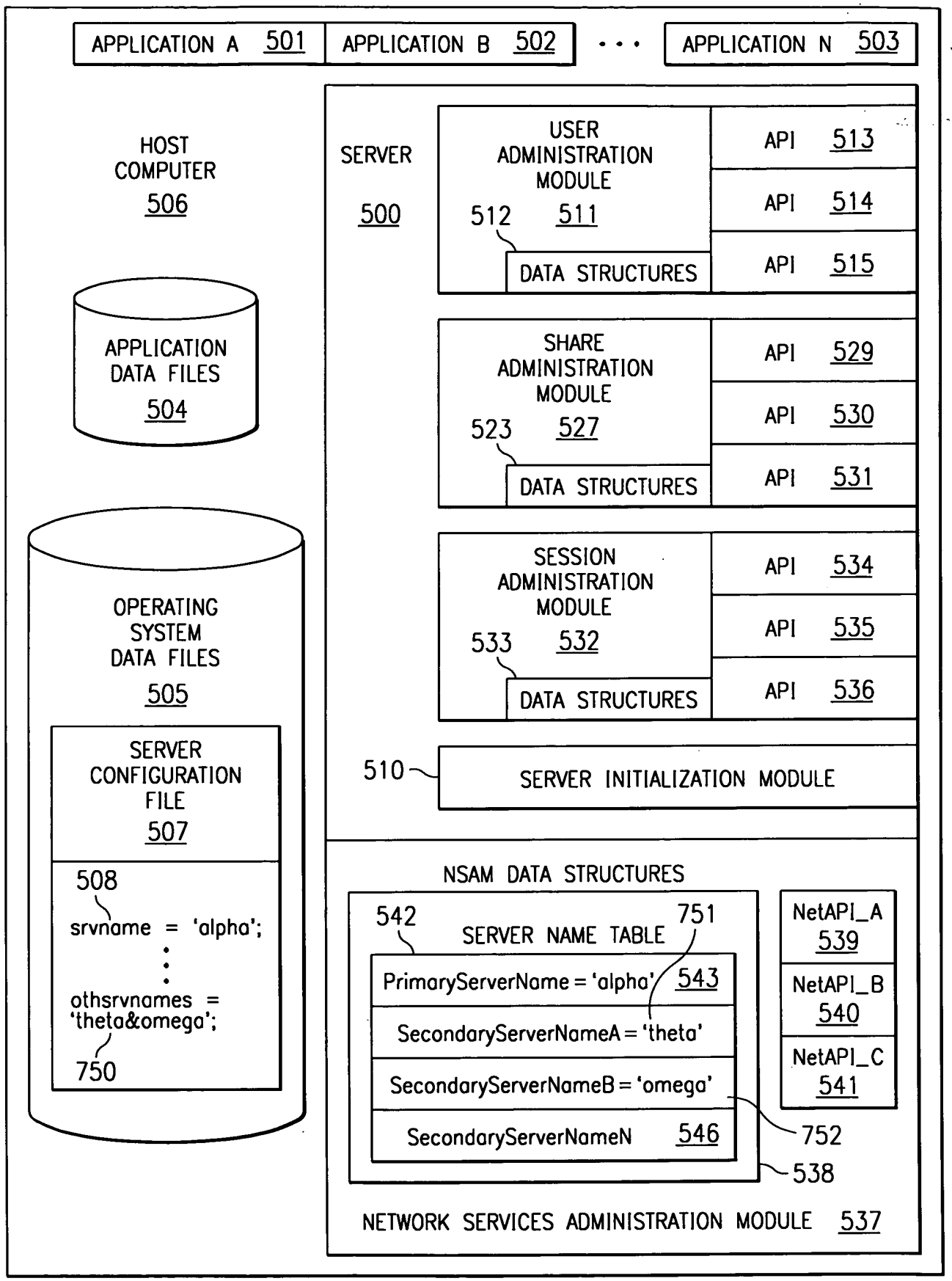

APPLICATION A 501
APPLICATION B 502
APPLICATION N 503
HOST COMPUTER 506
APPLICATION DATA FILES 504
OPERATING SYSTEM DATA FILES 505
SERVER CONFIGURATION FILE 507
508
srvname = 'alpha';
othsrvnames = 'theta&omega';
750
SERVER 500
USER ADMINISTRATION MODULE 511
512
DATA STRUCTURES
API 513
API 514
API 515
SHARE ADMINISTRATION MODULE 527
523
DATA STRUCTURES
API 529
API 530
API 531
SESSION ADMINISTRATION MODULE 532
533
DATA STRUCTURES
API 534
API 535
API 536
510
SERVER INITIALIZATION MODULE
NSAM DATA STRUCTURES
542
SERVER NAME TABLE
751
PrimaryServerName = 'alpha' 543
SecondaryServerNameA = 'theta'
SecondaryServerNameB = 'omega'
SecondaryServerNameN 546
752
538
NetAPI_A 539
NetAPI_B 540
NetAPI_C 541
NETWORK SERVICES ADMINISTRATION MODULE 537

FIG. 7

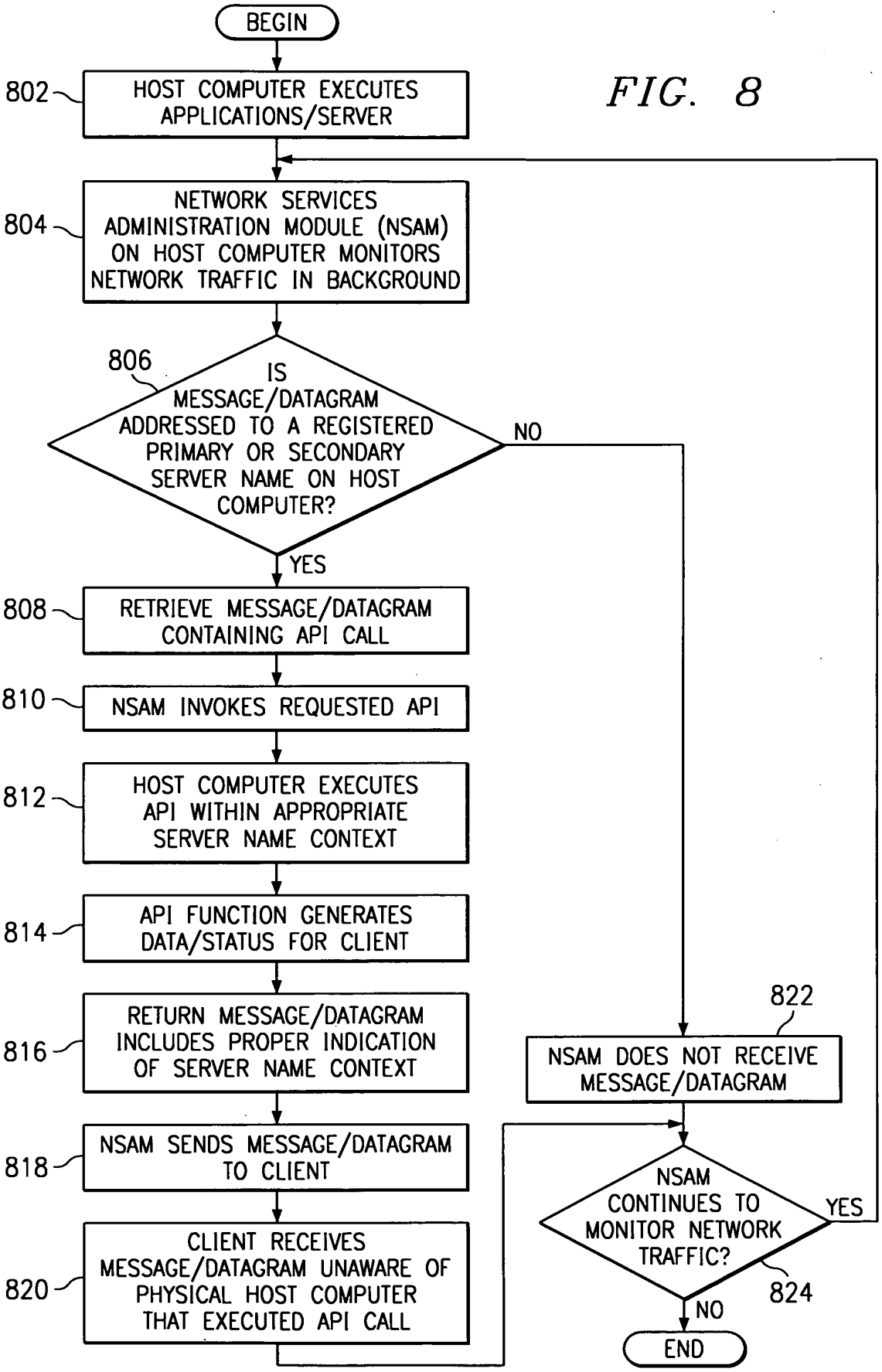

BEGIN
802
HOST COMPUTER EXECUTES APPLICATIONS/SERVER
804
NETWORK SERVICES ADMINISTRATION MODULE (NSAM) ON HOST COMPUTER MONITORS NETWORK TRAFFIC IN BACKGROUND
806
IS MESSAGE/DATAGRAM ADDRESSED TO A REGISTERED PRIMARY OR SECONDARY SERVER NAME ON HOST COMPUTER?
NO
YES
808
RETRIEVE MESSAGE/DATAGRAM CONTAINING API CALL
810
NSAM INVOKES REQUESTED API
812
HOST COMPUTER EXECUTES API WITHIN APPROPRIATE SERVER NAME CONTEXT
814
API FUNCTION GENERATES DATA/STATUS FOR CLIENT
816
RETURN MESSAGE/DATAGRAM INCLUDES PROPER INDICATION OF SERVER NAME CONTEXT
818
NSAM SENDS MESSAGE/DATAGRAM TO CLIENT
820
CLIENT RECEIVES MESSAGE/DATAGRAM UNAWARE OF PHYSICAL HOST COMPUTER THAT EXECUTED API CALL
822
NSAM DOES NOT RECEIVE MESSAGE/DATAGRAM
NSAM CONTINUES TO MONITOR NETWORK TRAFFIC?
824
YES
NO
END

FIG. 8

FIG. 9A

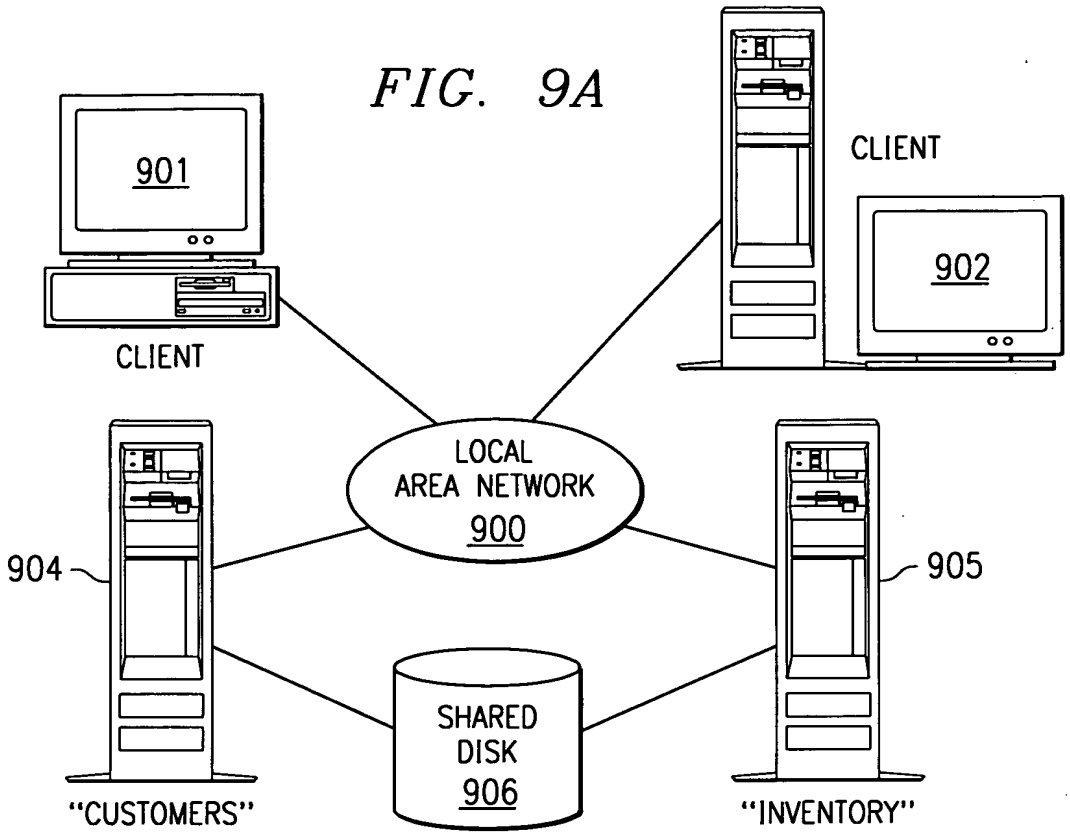

901
CLIENT
CLIENT
902
LOCAL
AREA NETWORK
900
904
905
SHARED
DISK
906
"CUSTOMERS"
"INVENTORY"

FIG. 9B

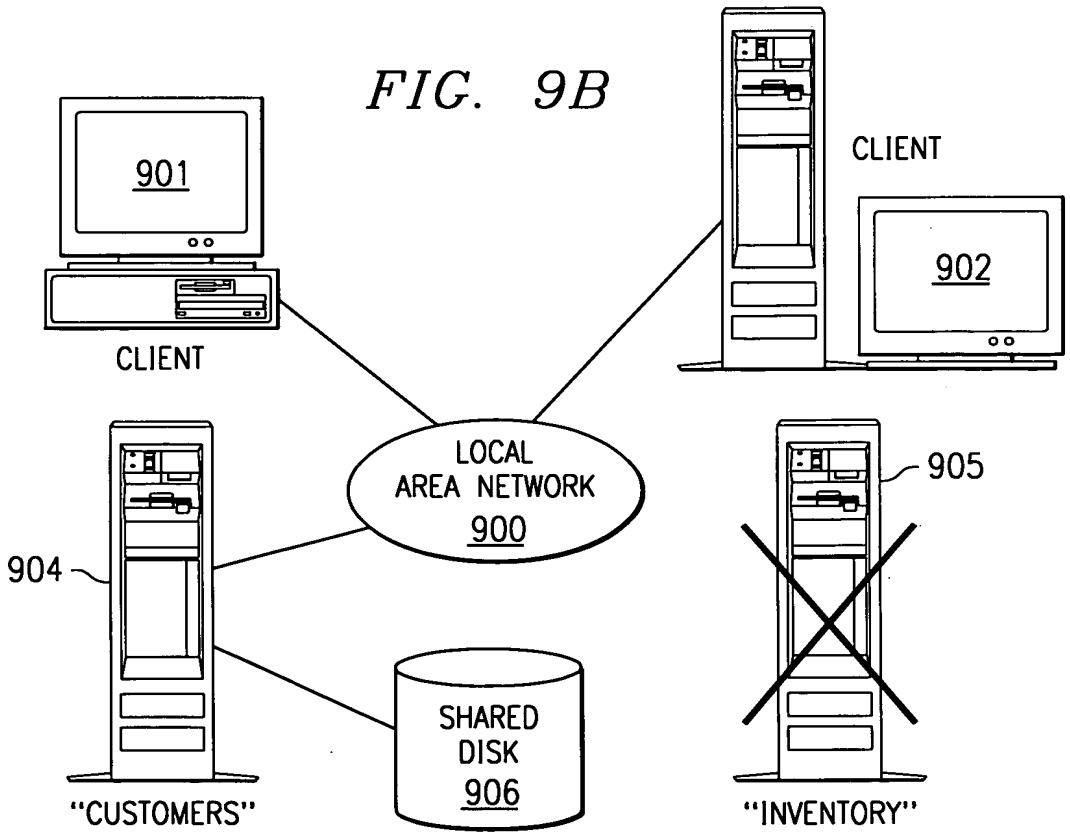

901
CLIENT
CLIENT
902
LOCAL
AREA NETWORK
900
905
904
SHARED
DISK
906
"CUSTOMERS"
"INVENTORY"

FIG. 9C

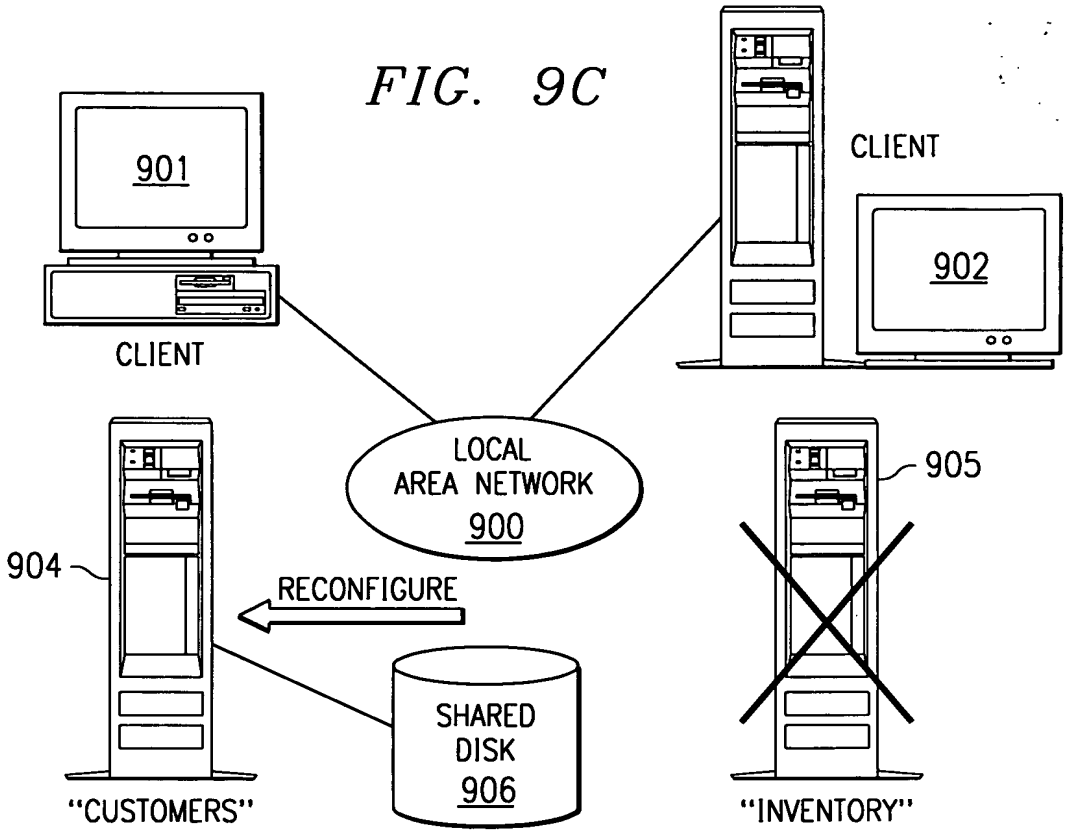

901
CLIENT
CLIENT
902
LOCAL
AREA NETWORK
900
905
904
RECONFIGURE
SHARED
DISK
906
"CUSTOMERS"
"INVENTORY"

FIG. 9D

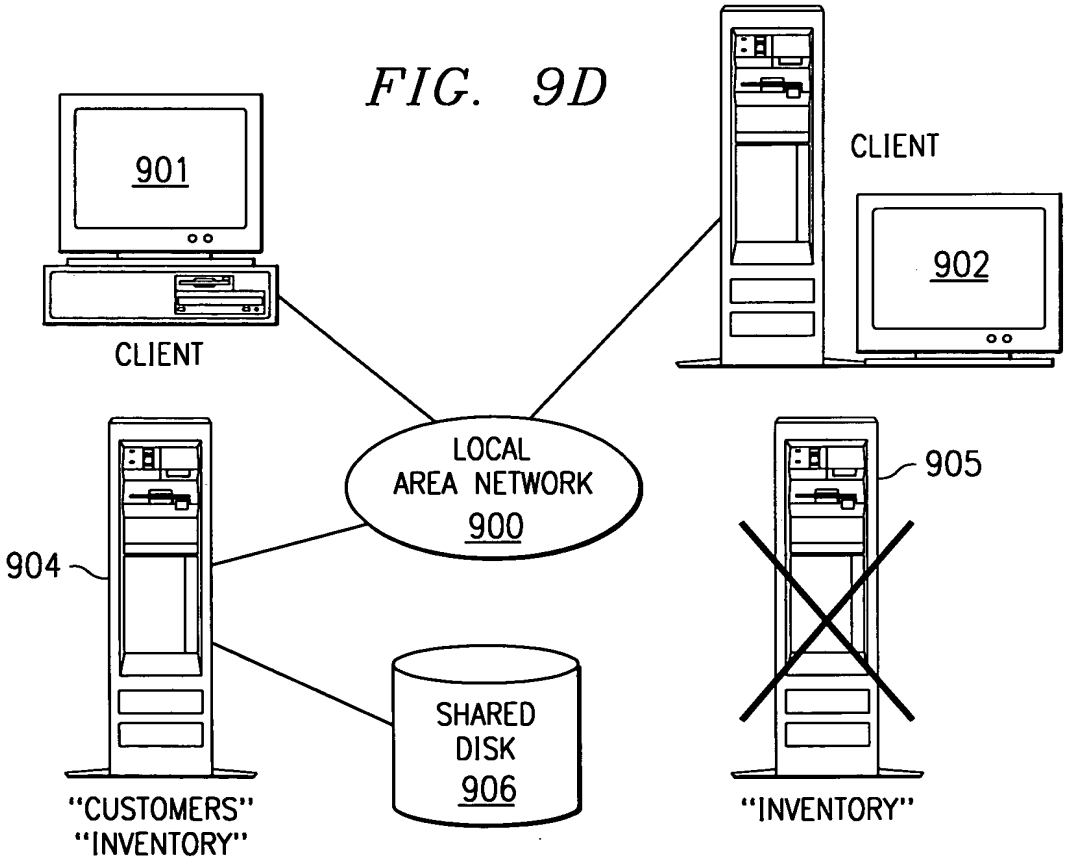

901
CLIENT
CLIENT
902
LOCAL
AREA NETWORK
900
905
904
SHARED
DISK
906
"CUSTOMERS"
"INVENTORY"
"INVENTORY"

FIG. 10A

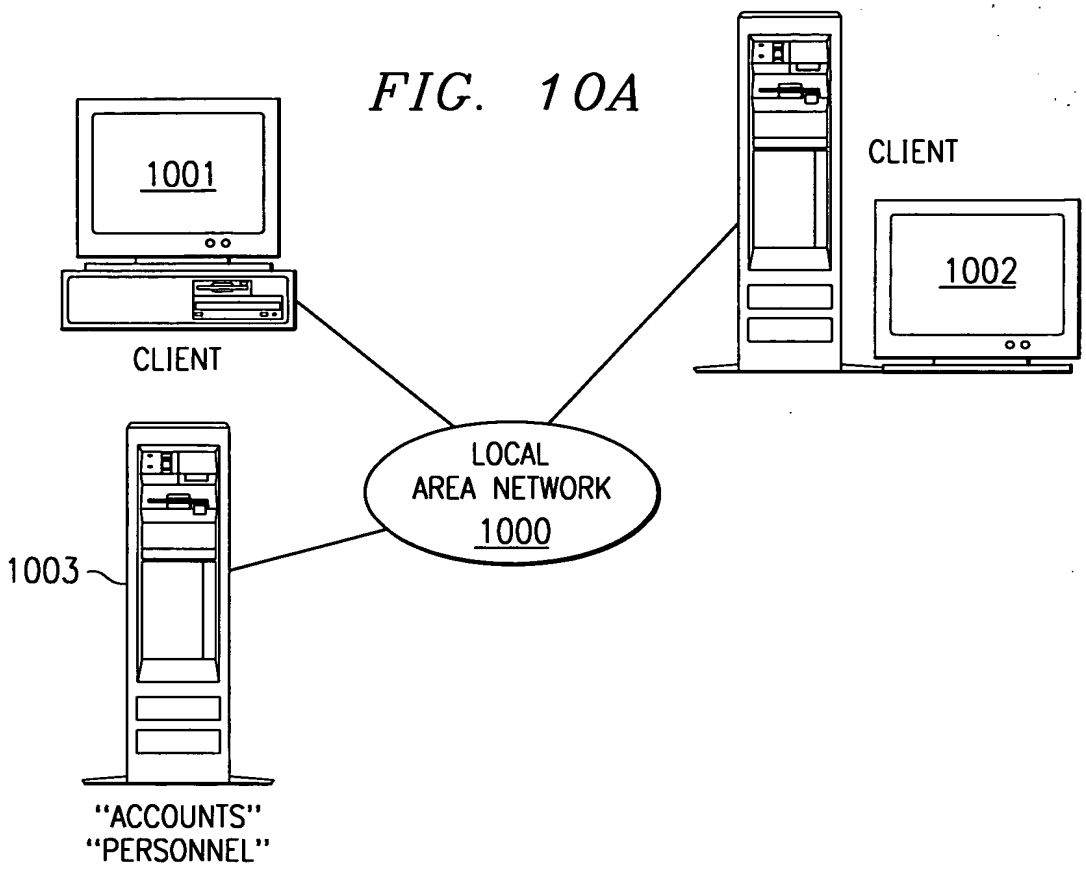


FIG. 10B

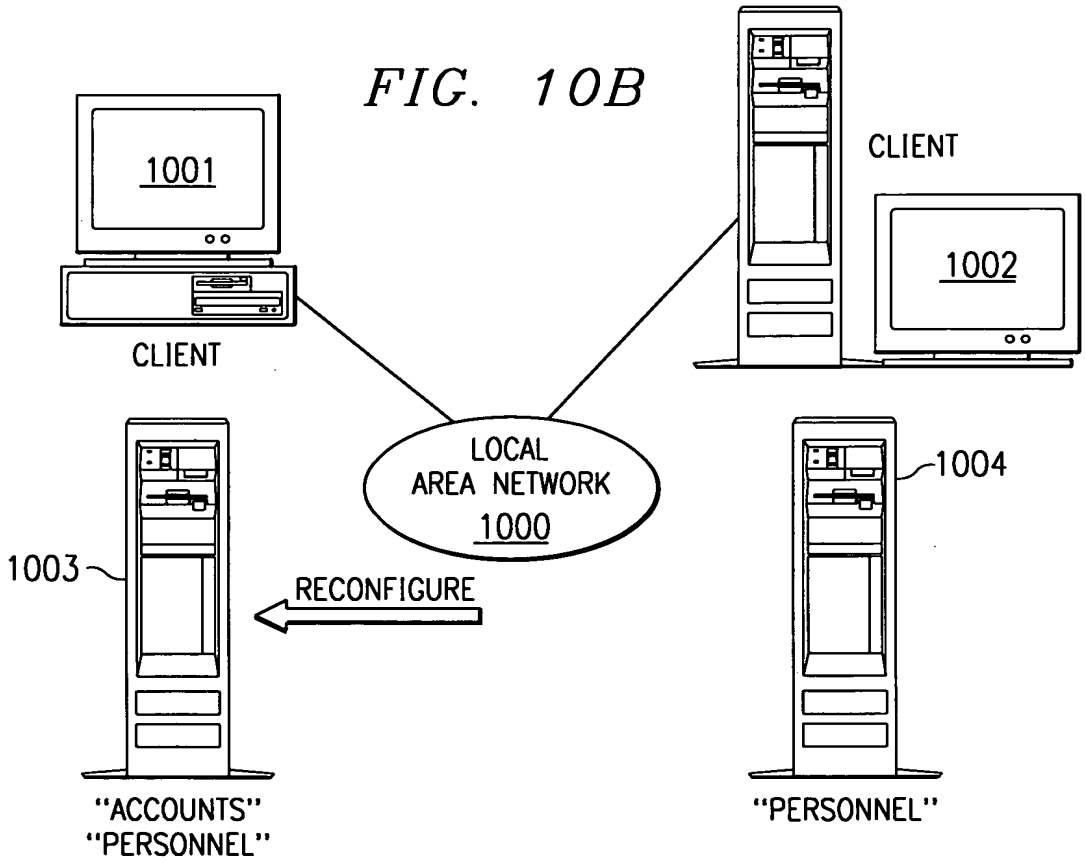


FIG. 10C

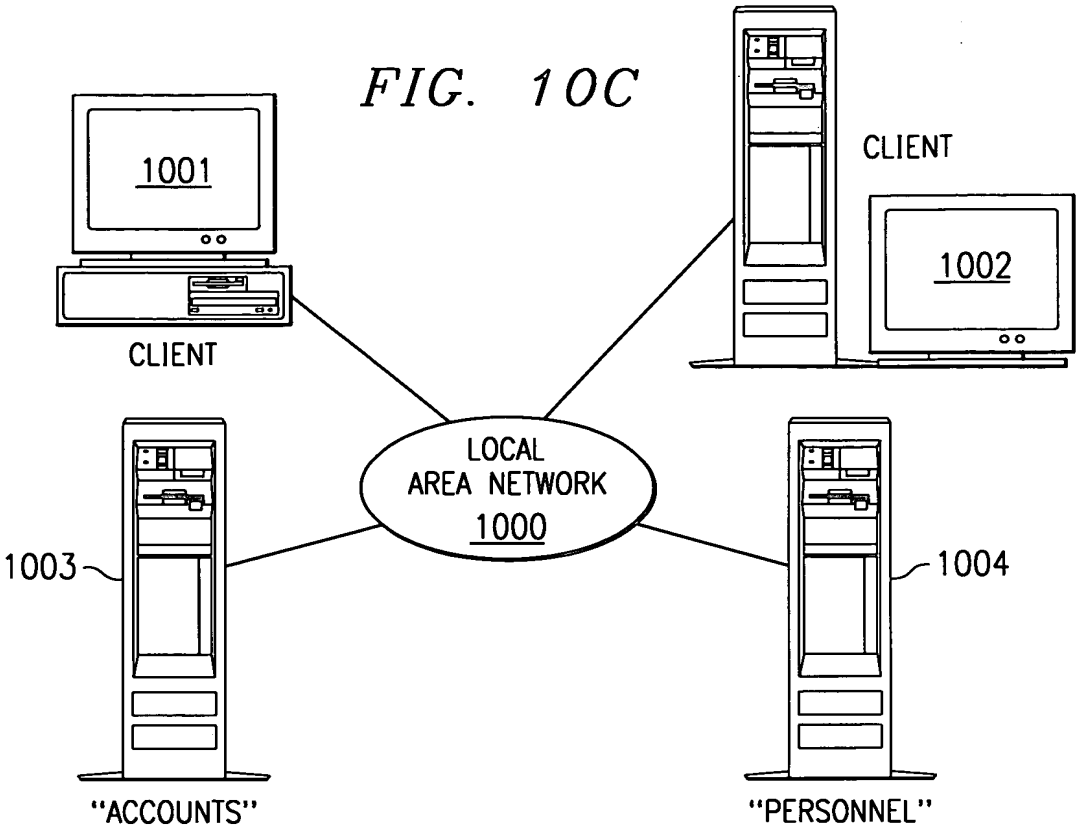
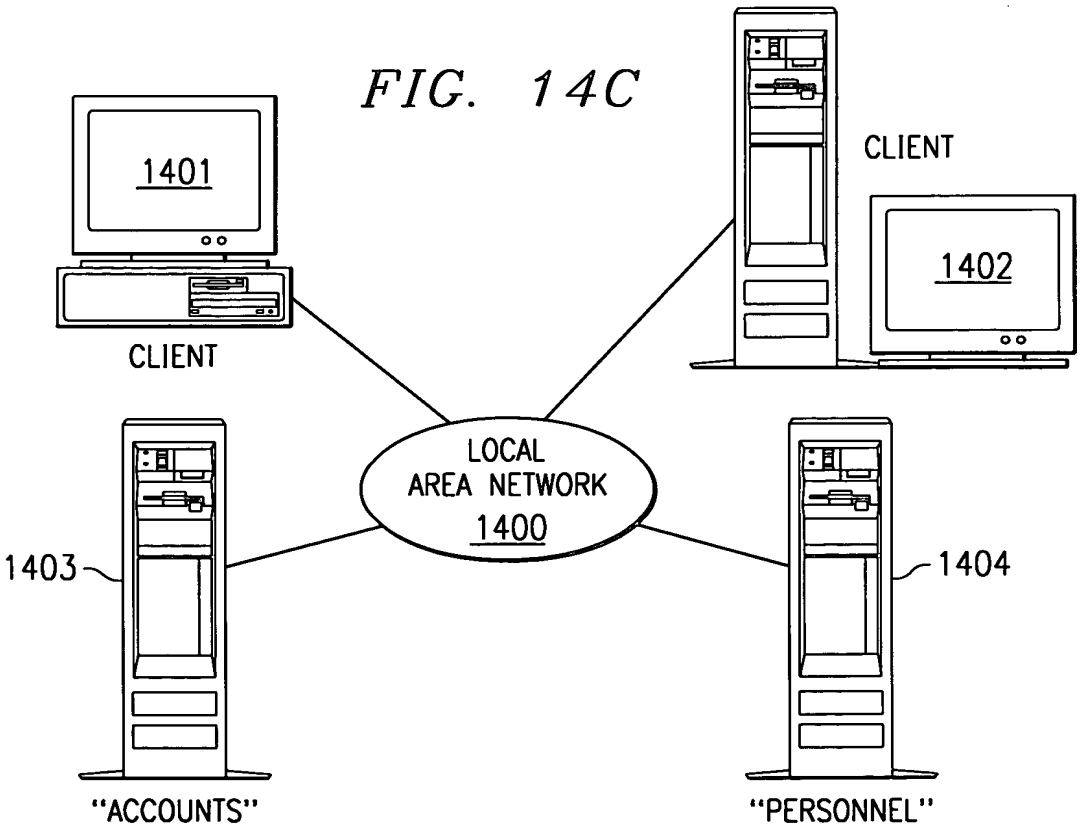


FIG. 14C



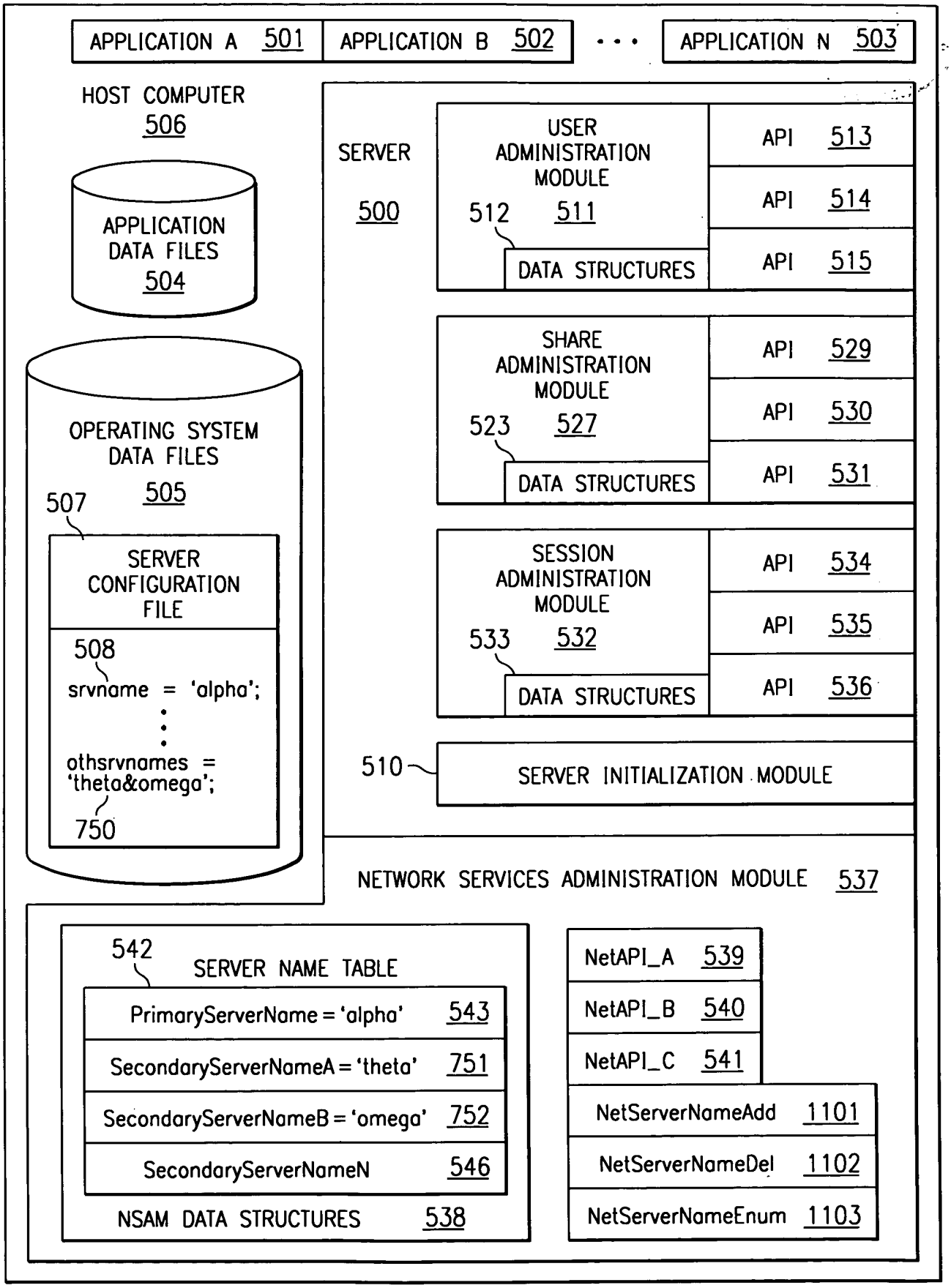

APPLICATION A 501
APPLICATION B 502
APPLICATION N 503
HOST COMPUTER 506
APPLICATION DATA FILES 504
OPERATING SYSTEM DATA FILES 505
507
SERVER CONFIGURATION FILE
508
srvname = 'alpha';
othsrvnames = 'theta&omega';
750
SERVER 500
USER ADMINISTRATION MODULE 511
512
DATA STRUCTURES
API 513
API 514
API 515
SHARE ADMINISTRATION MODULE 527
523
DATA STRUCTURES
API 529
API 530
API 531
SESSION ADMINISTRATION MODULE 532
533
DATA STRUCTURES
API 534
API 535
API 536
510
SERVER INITIALIZATION MODULE
NETWORK SERVICES ADMINISTRATION MODULE 537
542
SERVER NAME TABLE
PrimaryServerName = 'alpha' 543
SecondaryServerNameA = 'theta' 751
SecondaryServerNameB = 'omega' 752
SecondaryServerNameN 546
NSAM DATA STRUCTURES 538
NetAPI_A 539
NetAPI_B 540
NetAPI_C 541
NetServerNameAdd 1101
NetServerNameDel 1102
NetServerNameEnum 1103

FIG. 11

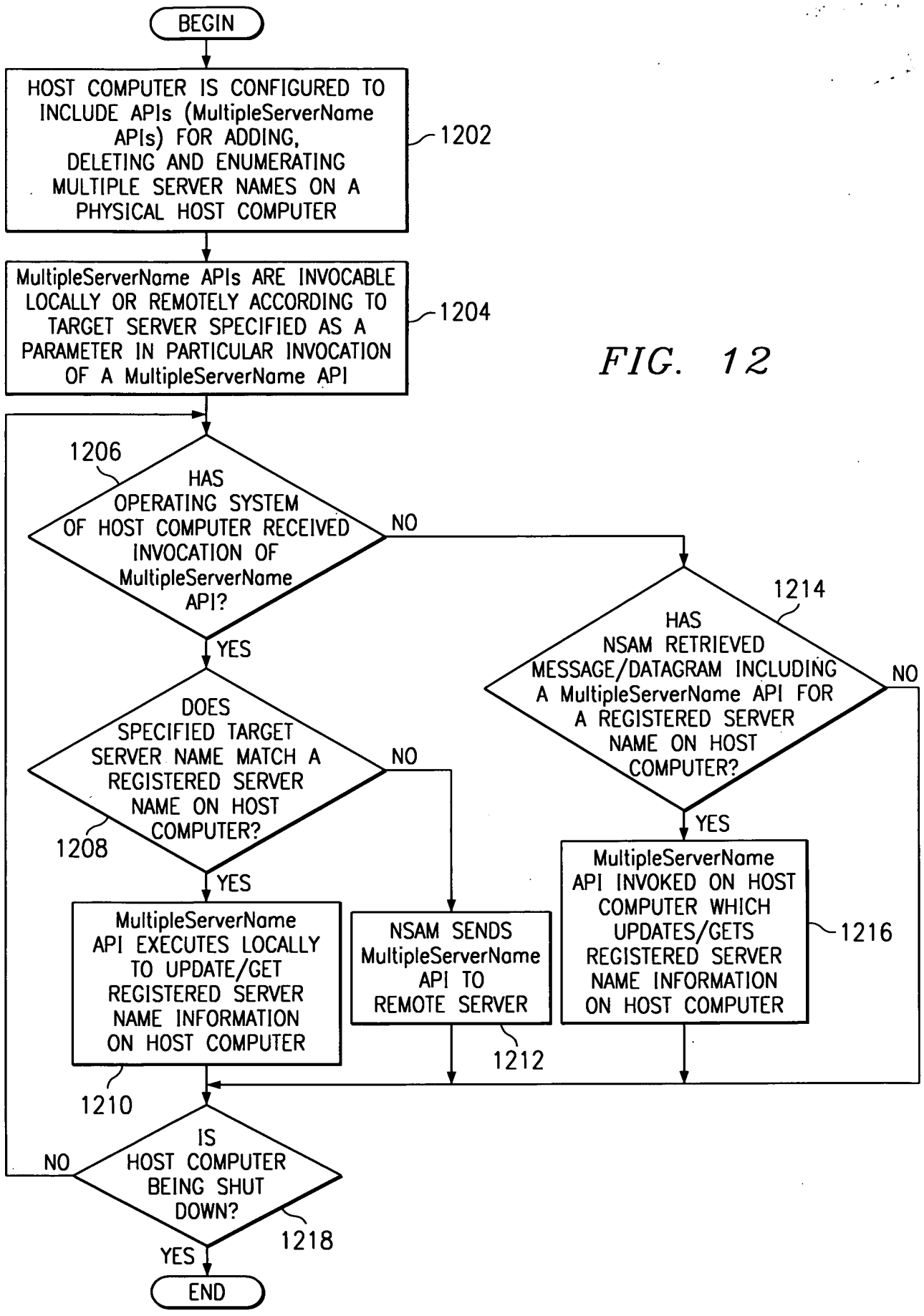

BEGIN
HOST COMPUTER IS CONFIGURED TO INCLUDE APIs (MultipleServerName APIs) FOR ADDING, DELETING AND ENUMERATING MULTIPLE SERVER NAMES ON A PHYSICAL HOST COMPUTER
1202
MultipleServerName APIs ARE INVOCABLE LOCALLY OR REMOTELY ACCORDING TO TARGET SERVER SPECIFIED AS A PARAMETER IN PARTICULAR INVOCATION OF A MultipleServerName API
1204
1206
HAS OPERATING SYSTEM OF HOST COMPUTER RECEIVED INVOCATION OF MultipleServerName API?
NO
YES
DOES SPECIFIED TARGET SERVER NAME MATCH A REGISTERED SERVER NAME ON HOST COMPUTER?
1208
NO
YES
MultipleServerName API EXECUTES LOCALLY TO UPDATE/GET REGISTERED SERVER NAME INFORMATION ON HOST COMPUTER
1210
NSAM SENDS MultipleServerName API TO REMOTE SERVER
1212
1214
HAS NSAM RETRIEVED MESSAGE/DATAGRAM INCLUDING A MultipleServerName API FOR A REGISTERED SERVER NAME ON HOST COMPUTER?
NO
YES
MultipleServerName API INVOKED ON HOST COMPUTER WHICH UPDATES/GETS REGISTERED SERVER NAME INFORMATION ON HOST COMPUTER
1216
IS HOST COMPUTER BEING SHUT DOWN?
NO
1218
YES
END

FIG. 12

FIG. 13A

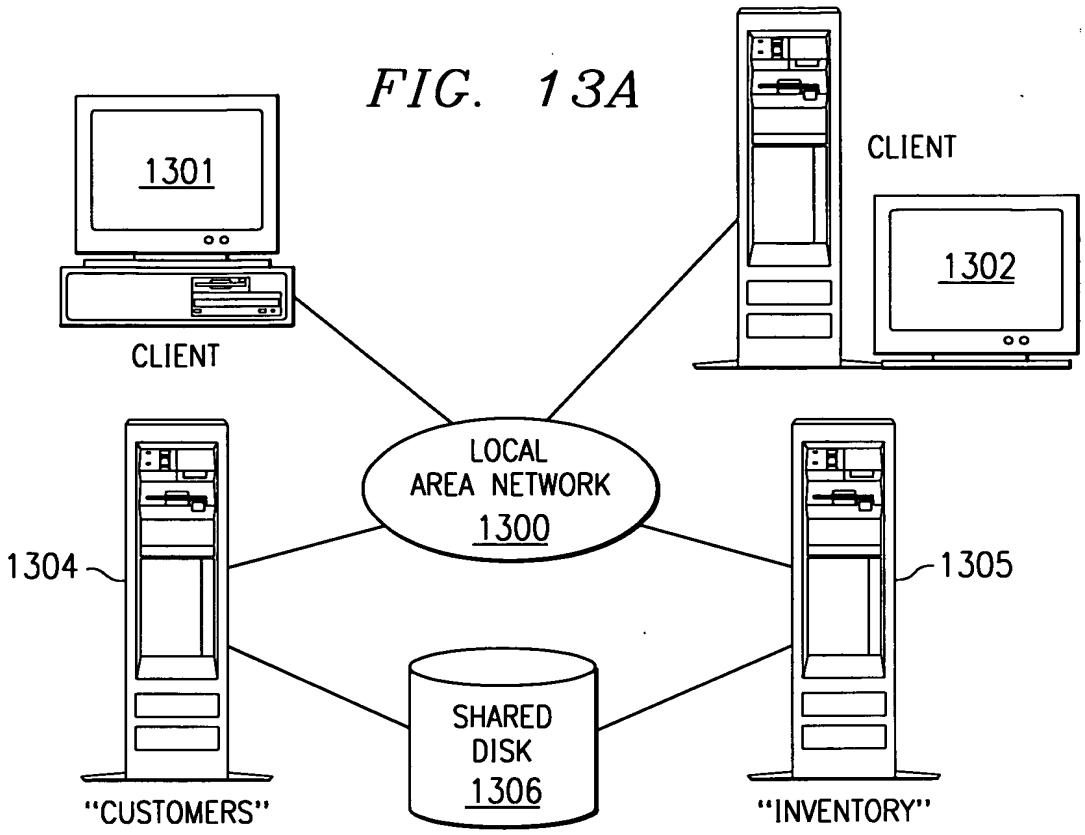


FIG. 13B

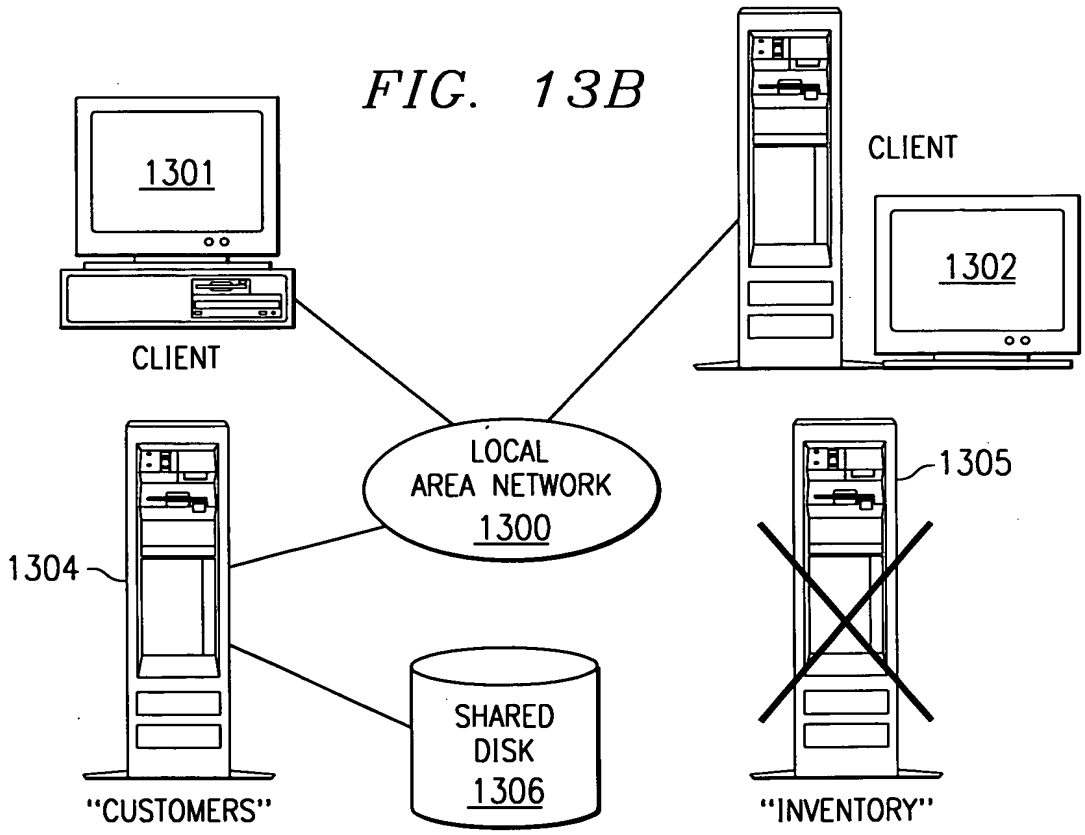


FIG. 13C

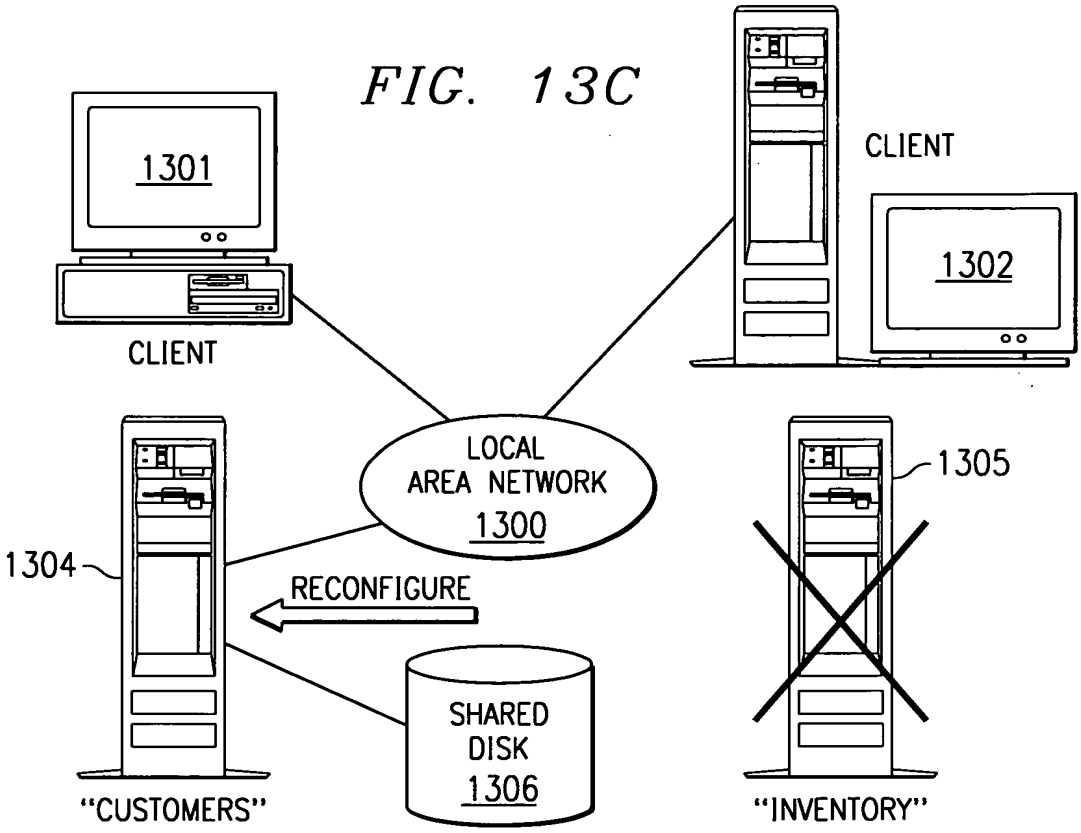


FIG. 13D

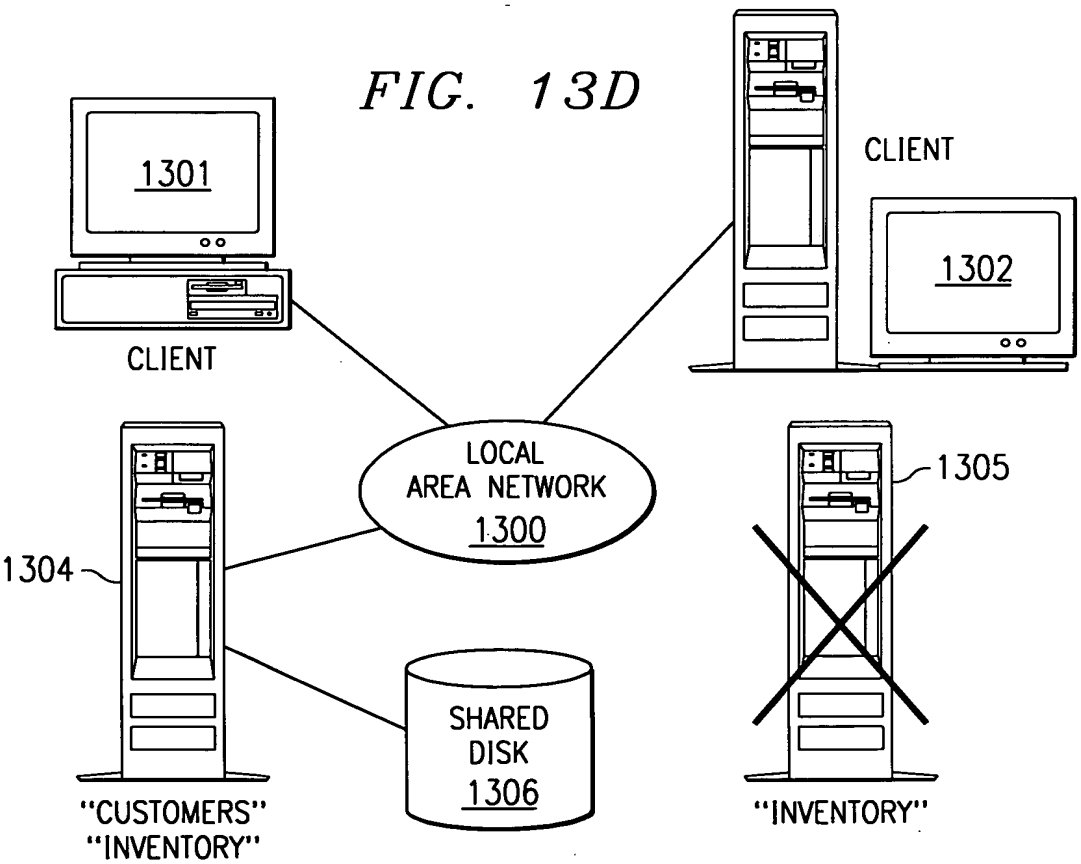


FIG. 14A

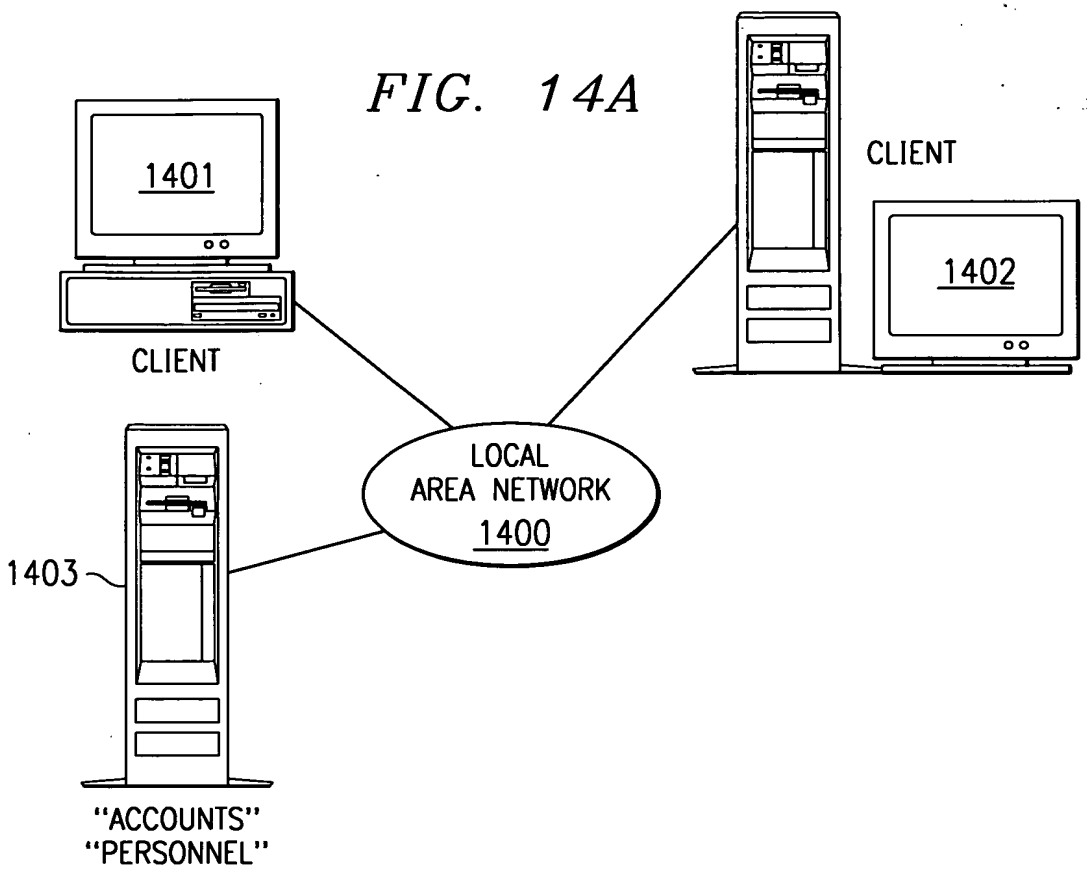


FIG. 14B

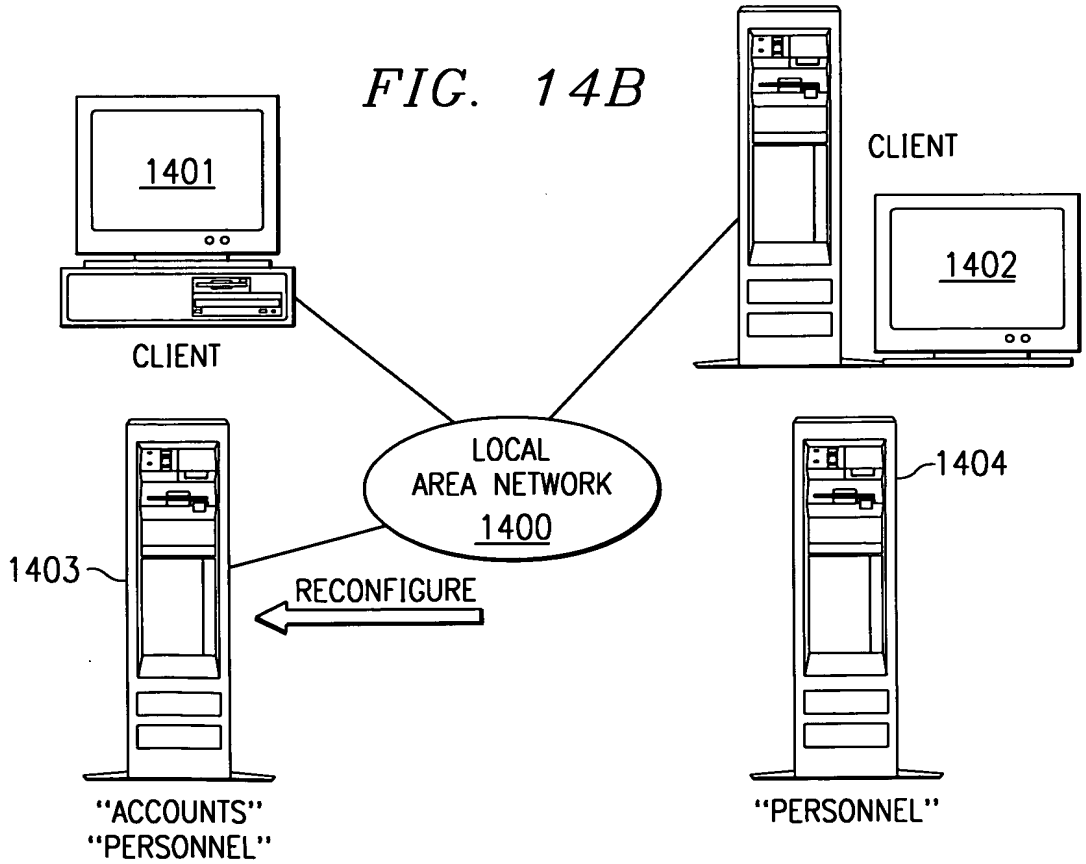
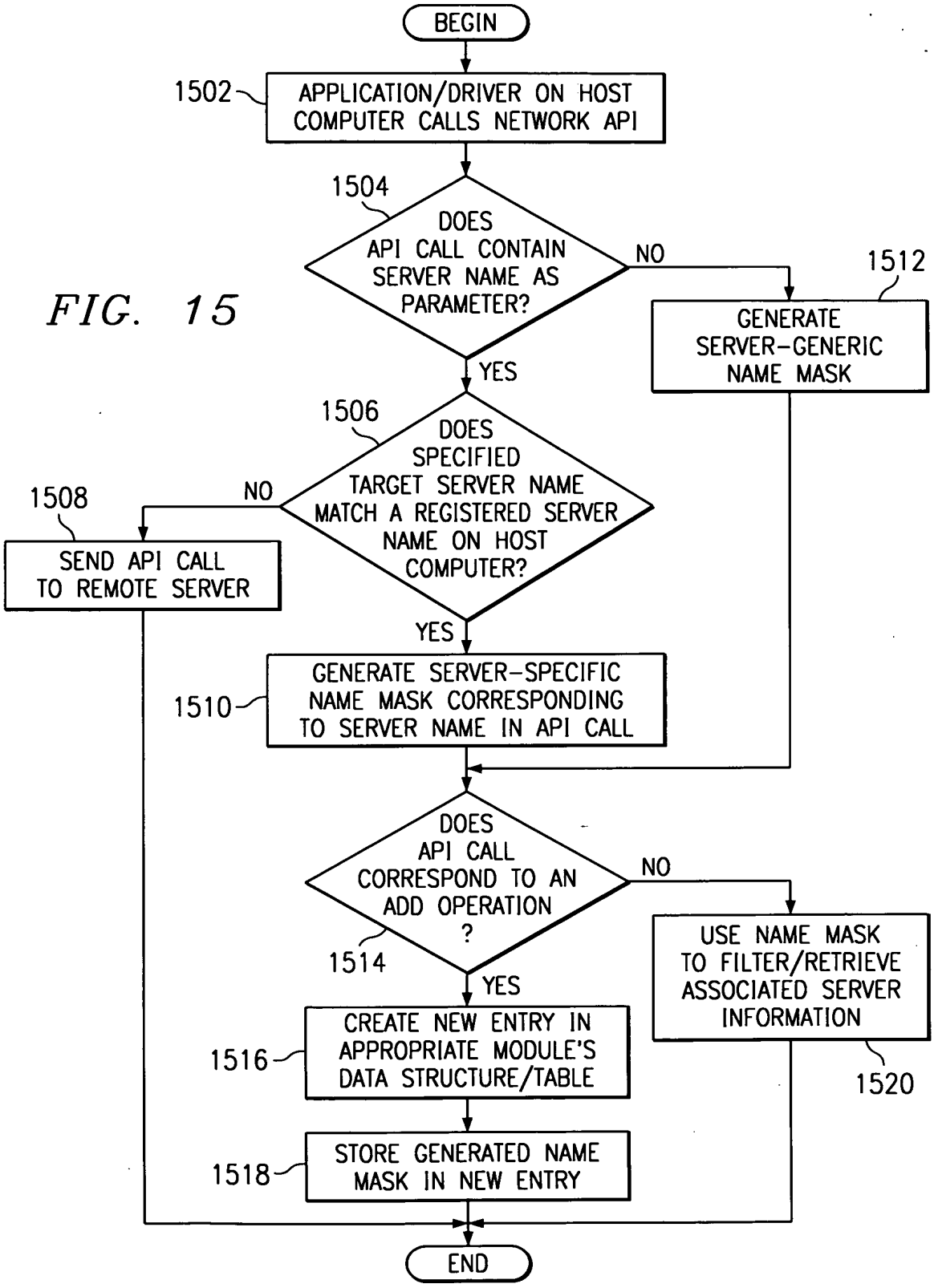


FIG. 15


BEGIN
1502
APPLICATION/DRIVER ON HOST COMPUTER CALLS NETWORK API
1504
DOES API CALL CONTAIN SERVER NAME AS PARAMETER?
NO
1512
GENERATE SERVER-GENERIC NAME MASK
YES
1506
DOES SPECIFIED TARGET SERVER NAME MATCH A REGISTERED SERVER NAME ON HOST COMPUTER?
NO
1508
SEND API CALL TO REMOTE SERVER
YES
1510
GENERATE SERVER-SPECIFIC NAME MASK CORRESPONDING TO SERVER NAME IN API CALL
DOES API CALL CORRESPOND TO AN ADD OPERATION ?
1514
NO
USE NAME MASK TO FILTER/RETRIEVE ASSOCIATED SERVER INFORMATION
1520
YES
1516
CREATE NEW ENTRY IN APPROPRIATE MODULE'S DATA STRUCTURE/TABLE
1518
STORE GENERATED NAME MASK IN NEW ENTRY
END

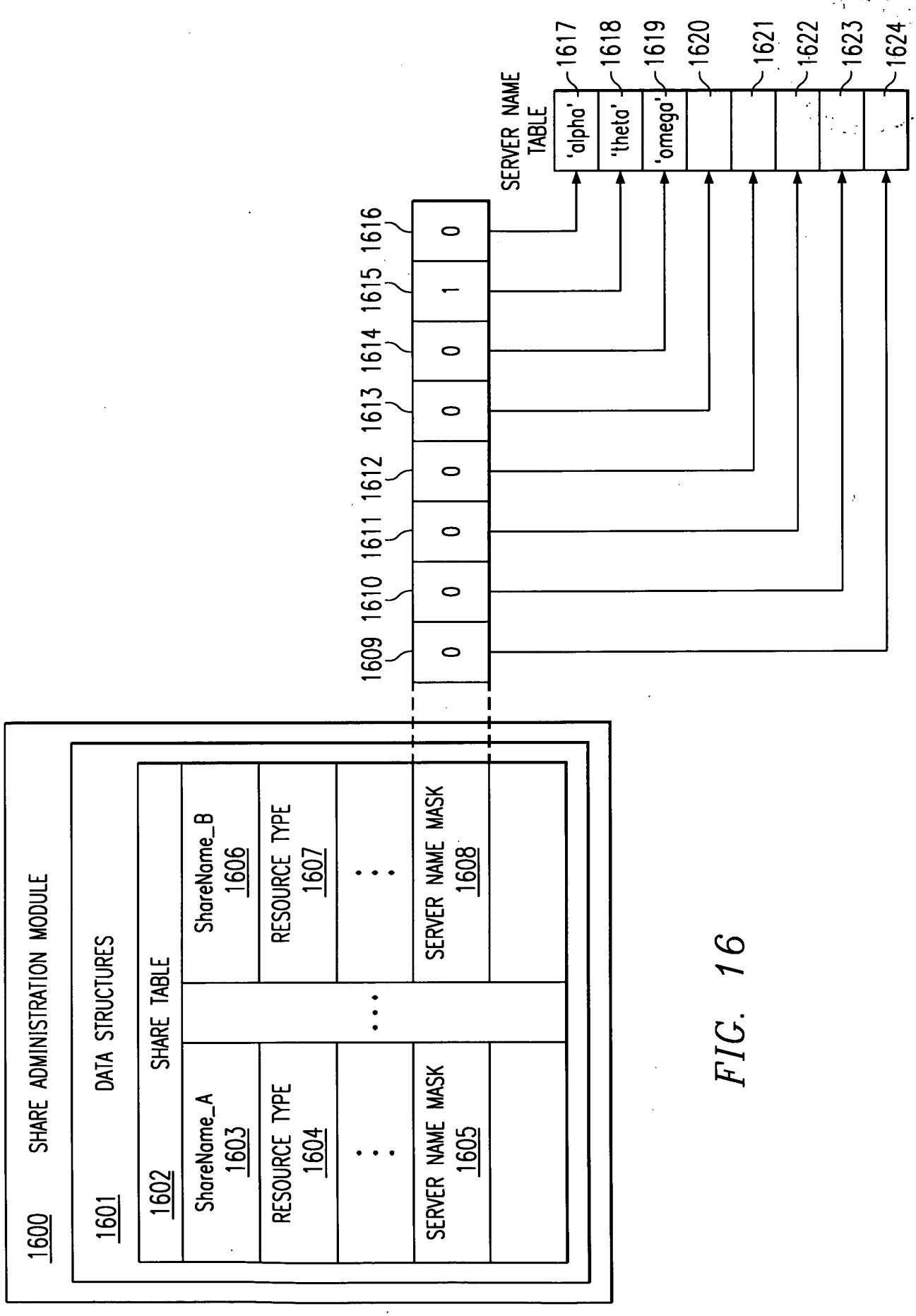

1600 SHARE ADMINISTRATION MODULE
1601 DATA STRUCTURES
1602 SHARE TABLE
ShareName_A 1603
RESOURCE TYPE 1604
SERVER NAME MASK 1605
ShareName_B 1606
RESOURCE TYPE 1607
SERVER NAME MASK 1608
1609 1610 1611 1612 1613 1614 1615 1616
0 0 0 0 0 0 1 0
SERVER NAME TABLE
1617 1618 1619 1620 1621 1622 1623 1624
'alpha' 'theta' 'omega'

FIG. 16

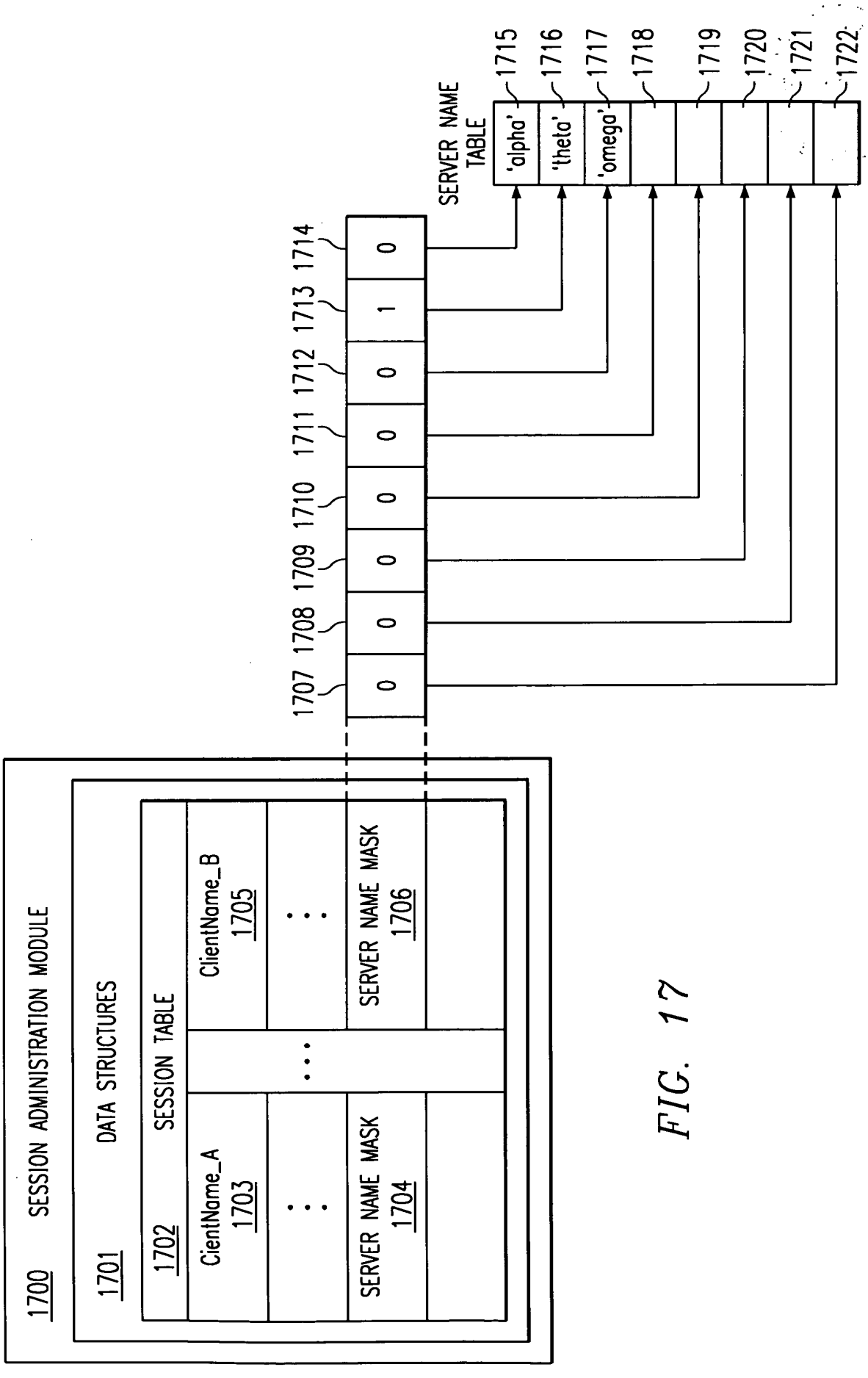

1700 SESSION ADMINISTRATION MODULE
1701 DATA STRUCTURES
1702 SESSION TABLE
ClientName_A 1703
ClientName_B 1705
SERVER NAME MASK 1704
SERVER NAME MASK 1706
1707 1708 1709 1710 1711 1712 1713 1714
0 0 0 0 0 0 1 0
SERVER NAME TABLE
1715 1716 1717 1718 1719 1720 1721 1722
'alpha' 'theta' 'omega'

FIG. 17

FIG. 18

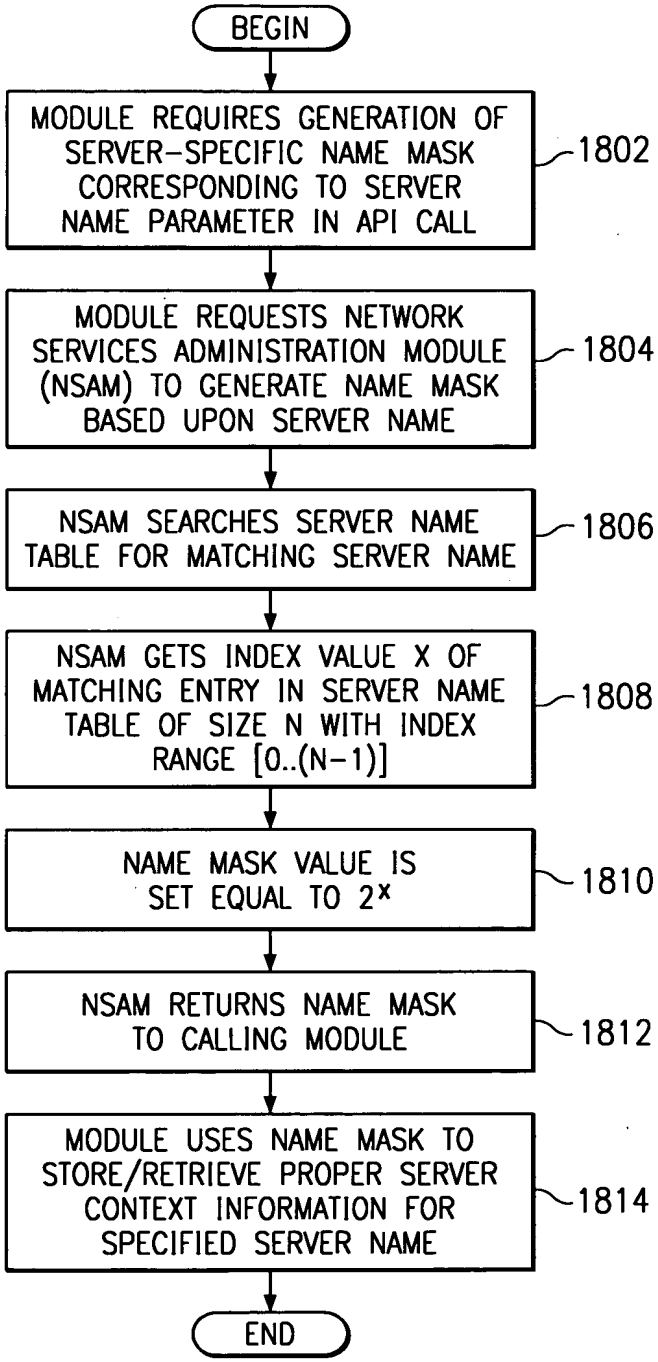
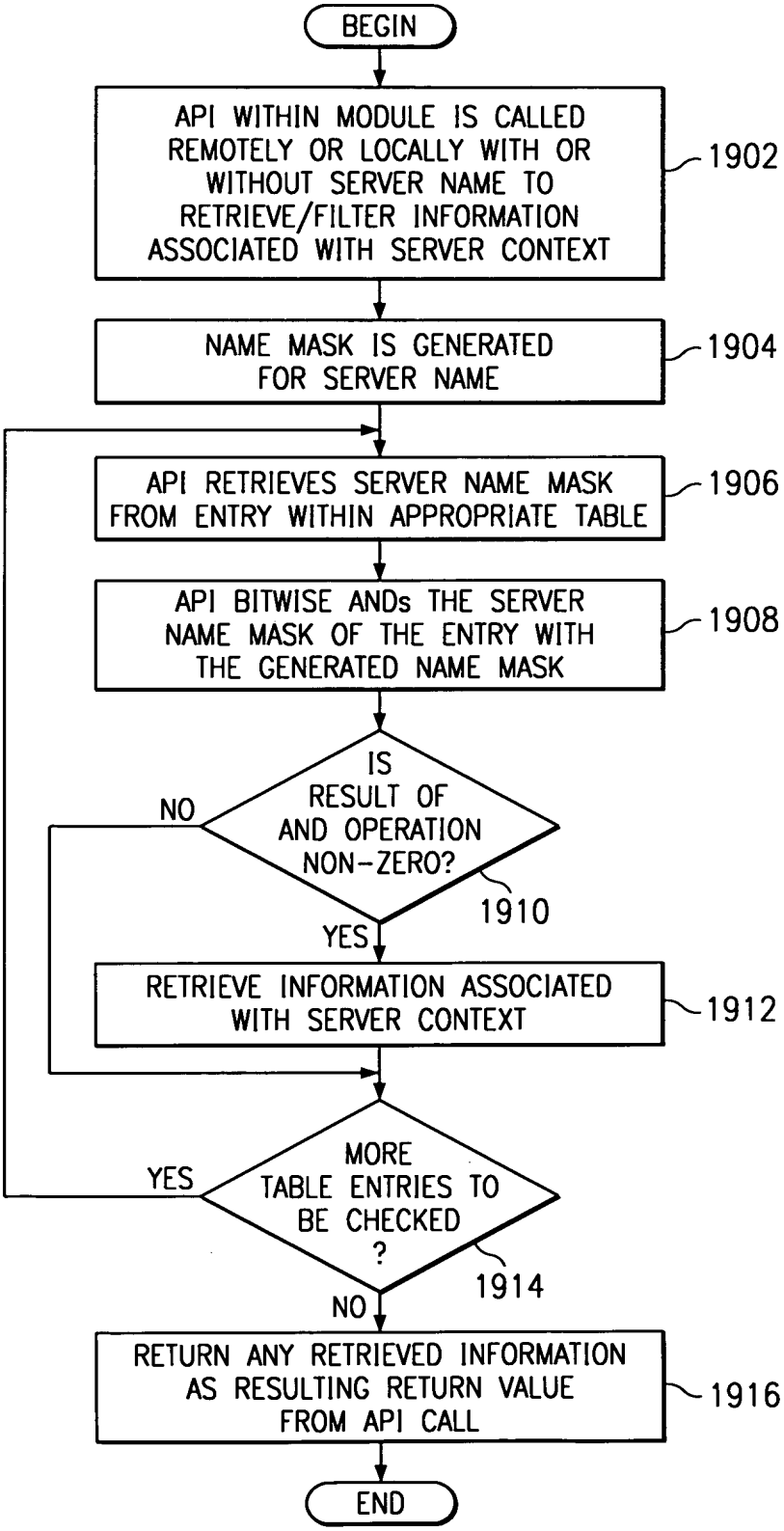

BEGIN
MODULE REQUIRES GENERATION OF SERVER-SPECIFIC NAME MASK CORRESPONDING TO SERVER NAME PARAMETER IN API CALL
1802
MODULE REQUESTS NETWORK SERVICES ADMINISTRATION MODULE (NSAM) TO GENERATE NAME MASK BASED UPON SERVER NAME
1804
NSAM SEARCHES SERVER NAME TABLE FOR MATCHING SERVER NAME
1806
NSAM GETS INDEX VALUE X OF MATCHING ENTRY IN SERVER NAME TABLE OF SIZE N WITH INDEX RANGE [0..(N-1)]
1808
NAME MASK VALUE IS SET EQUAL TO 2^X
1810
NSAM RETURNS NAME MASK TO CALLING MODULE
1812
MODULE USES NAME MASK TO STORE/RETRIEVE PROPER SERVER CONTEXT INFORMATION FOR SPECIFIED SERVER NAME
1814
END

FIG. 19


BEGIN
API WITHIN MODULE IS CALLED REMOTELY OR LOCALLY WITH OR WITHOUT SERVER NAME TO RETRIEVE/FILTER INFORMATION ASSOCIATED WITH SERVER CONTEXT
1902
NAME MASK IS GENERATED FOR SERVER NAME
1904
API RETRIEVES SERVER NAME MASK FROM ENTRY WITHIN APPROPRIATE TABLE
1906
API BITWISE ANDs THE SERVER NAME MASK OF THE ENTRY WITH THE GENERATED NAME MASK
1908
IS RESULT OF AND OPERATION NON-ZERO?
1910
NO
YES
RETRIEVE INFORMATION ASSOCIATED WITH SERVER CONTEXT
1912
MORE TABLE ENTRIES TO BE CHECKED ?
1914
YES
NO
RETURN ANY RETRIEVED INFORMATION AS RESULTING RETURN VALUE FROM API CALL
1916
END